

thorium dioxide

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| Other names: | thorium(IV) oxide |
| Inchi: | InChI=1S/2O.Th |
| InchiKey: | ZCUFMDLYAMJYST-UHFFFAOYSA-N |
| Formula: | O2Th |
| SMILES: | O=[Th]=O |
| Mol. weight [g/mol]: | 264.04 |
| CAS: | 1314-20-1 |

Physical Properties

| Property code | Value | Unit | Source |
|---------------|-----------------|---------|--------------|
| hfs | -1226.40 ± 3.50 | kJ/mol | NIST Webbook |
| ie | 8.70 ± 0.15 | eV | NIST Webbook |
| ie | 8.00 ± 1.00 | eV | NIST Webbook |
| ie | 8.70 ± 0.15 | eV | NIST Webbook |
| ie | 10.90 | eV | NIST Webbook |
| ss | 65.23 ± 0.20 | J/mol×K | NIST Webbook |

Temperature Dependent Properties

| Property code | Value | Unit | Temperature [K] | Source |
|---------------|-------|---------|-----------------|--|
| cps | 62.10 | J/mol×K | 300.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 61.80 | J/mol×K | 310.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |

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|-----|-------|---------|--------|--|
| cps | 62.80 | J/molxK | 320.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 63.50 | J/molxK | 330.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 64.20 | J/molxK | 340.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 65.10 | J/molxK | 350.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 65.60 | J/molxK | 360.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 65.90 | J/molxK | 370.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 66.80 | J/molxK | 380.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |

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|-----|-------|---------|--------|--|
| cps | 67.30 | J/molxK | 390.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 67.70 | J/molxK | 400.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 68.00 | J/molxK | 410.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 68.40 | J/molxK | 420.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 68.60 | J/molxK | 430.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 68.90 | J/molxK | 440.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 69.60 | J/molxK | 450.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |

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|-----|-------|---------|--------|--|
| cps | 69.80 | J/molxK | 460.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 70.10 | J/molxK | 470.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 70.20 | J/molxK | 480.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 70.50 | J/molxK | 490.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 70.70 | J/molxK | 500.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 70.90 | J/molxK | 510.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 71.20 | J/molxK | 520.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |

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|-----|-------|---------|--------|--|
| cps | 71.40 | J/molxK | 530.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 71.70 | J/molxK | 540.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 71.90 | J/molxK | 550.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 72.00 | J/molxK | 560.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 72.10 | J/molxK | 570.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 72.30 | J/molxK | 580.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 72.50 | J/molxK | 590.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |

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|-----|-------|---------|--------|--|
| cps | 72.50 | J/molxK | 600.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 72.50 | J/molxK | 610.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 73.00 | J/molxK | 620.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 73.00 | J/molxK | 630.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 73.30 | J/molxK | 640.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 73.60 | J/molxK | 650.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 73.50 | J/molxK | 660.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |

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|-----|-------|---------|--------|--|
| cps | 73.60 | J/molxK | 670.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 73.60 | J/molxK | 680.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 73.40 | J/molxK | 690.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 73.80 | J/molxK | 700.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 74.50 | J/molxK | 710.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 74.50 | J/molxK | 720.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 74.60 | J/molxK | 730.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |

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|-----|-------|---------|--------|--|
| cps | 74.70 | J/molxK | 739.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 74.60 | J/molxK | 750.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 75.00 | J/molxK | 760.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 75.30 | J/molxK | 770.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 75.30 | J/molxK | 780.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 75.30 | J/molxK | 790.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 75.70 | J/molxK | 800.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |

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|-----|-------|---------|--------|--|
| cps | 75.70 | J/molxK | 810.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 75.70 | J/molxK | 820.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 75.90 | J/molxK | 830.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 76.00 | J/molxK | 840.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 76.10 | J/molxK | 850.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 76.40 | J/molxK | 860.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |
| cps | 76.10 | J/molxK | 870.00 | Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method |

Sources

Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method: <https://www.doi.org/10.1016/j.tca.2017.04.014>
High temperature phase transition of mixed (PuO₂ + ThO₂) investigated by laser interferometry: <http://webbook.nist.gov/cgi/cbook.cgi?ID=C1314201&Units=SI>
Thermodynamic chemistry of UO₂ - ThO₂ and UO₂ - ZrO₂ fluorite solid solutions: <https://www.doi.org/10.1016/j.jct.2014.10.006>
<https://www.doi.org/10.1016/j.jct.2017.05.026>

Legend

cps: Solid phase heat capacity
hfs: Solid phase enthalpy of formation at standard conditions
ie: Ionization energy
ss: Solid phase molar entropy at standard conditions

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